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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/771,986	02/03/2004	Russell Hudyma	01641/100K021-US5	3566
7278	7590	12/30/2004	EXAMINER	
DARBY & DARBY P.C.			PRITCHETT, JOSHUA L	
P. O. BOX 5257			ART UNIT	
NEW YORK, NY 10150-5257			PAPER NUMBER	

2872

DATE MAILED: 12/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/771,986

Applicant(s)

HUDYMA, RUSSELL

Examiner

Joshua L. Pritchett

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☒ Claim(s) 1-10, 12 and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 6/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This action is in response to Amendment filed October 12, 2004. Claims 1, 7, 11 and 13 have been amended as requested by the applicant.

Claim Objections

Claims 1-10, 12 and 15 objected to because of the following informalities: there is no antecedent basis in claims 1 and 7 for "the virtual image". Also claims 3 and 15 fail to limit claims 1 and 11 respectively because claims 1 and 11 already require a virtual intermediate image. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Regarding claims 1 and 7, Shafer teaches a photolithographic reduction projection catadioptric objective with a beam path comprising a first group (G1) including an even number of at least four mirrors (M1-M4) and a second at least substantially dioptric optical group (G2) more imageward than the first optical group including a number of lenses (Fig. 4) and wherein the first optical group provides compensative axial color correction for the second optical group (para 0014). Shafer states that the "first optical group provides compensative aberrative correction for the second optical group." "Compensative aberrative correction" is a broader limitation than the specific axial color correction claimed in claim 1, therefore Shafer anticipates the claim limitation. Shafer lacks reference to a virtual image formed physically behind the sixth mirror of the first optical group. Takahashi teaches a six-mirror projection system that includes a virtual intermediate image formed physically behind the sixth mirror (Fig. 1). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the first optic group of Shafer have the virtual intermediate image of formed at the location taught by Takahashi for the purpose of maintaining the integrity of the image to be projected.

Regarding claims 2, 9 and 10, Shafer teaches wherein the numerical aperture is 0.75 or more (para. 0014).

Regarding claim 3, Shafer teaches the first optical group producing an intermediate virtual image (Fig. 4; para. 0015).

Regarding claim 4, Shafer teaches wherein the at least four mirror of the first optical group include a convex mirror arranged most imageward in the beam path of the objective, and wherein the second optical group receives a beam from the convex mirror (Fig. 4).

Regarding claim 5, Shafer teaches wherein optical surfaces of each mirror of the objective are at least sections of surfaces of revolution each having a common axis of symmetry (Fig. 4; para. 0015).

Regarding claims 6, 8 and 12, Shafer teaches wherein the second optical group is configured for independent compensative lateral aberrative correction. Page 9 of the current application states, "Fig. 1 shows aperture stop AS in Group G2 placed in a quasi-symmetrical manner, allowing the lateral chromatic aberration to be at least nearly self corrected within group G2 itself." Shafer teaches an aperture stop (Fig. 4) and therefore would be capable of the claimed performance as claimed.

Claims 11 and 13-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shafer in view of Braat (US 6,255,661).

Regarding claim 11, Shafer teaches a photolithographic reduction projection catadioptric objective with a beam path comprising a first group (G1) including an even number of at least six mirrors (para 0056) and a second at least substantially dioptric optical group (G2) more imageward than the first optical group including a number of lenses (Fig. 4) and wherein the first optical group provides compensative axial color correction for the second optical group (para. 0014). Shafer states that the "first optical group provides compensative aberrative correction for the second optical group." "Compensative aberrative correction" is a broader limitation than the specific axial color correction claimed in claim 1, therefore Shafer anticipates the claim limitation. Shafer lacks reference to a virtual intermediate image formed between the fourth and fifth mirrors. Braat teaches a virtual intermediate image formed between the fourth and fifth

mirrors (abstract). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the first optical group of Shafer have the intermediate image formed at the location taught by Braat for the purpose of maintaining a coherent image through the projection system.

Regarding claim 13, Shafer teaches a photolithographic reduction projection catadioptric objective with a beam path comprising a first group (G1) including an even number of at least six mirrors (para 0056) and a second at least substantially dioptric optical group (G2) more imageward than the first optical group including a number of lenses (Fig. 4) and wherein the first optical group provides compensative axial color correction for the second optical group (para. 0014). Shafer states that the “first optical group provides compensative aberrative correction for the second optical group.” “Compensative aberrative correction” is a broader limitation than the specific axial color correction claimed in claim 1, therefore Shafer anticipates the claim limitation. Shafer lacks reference to the third and fourth mirrors located physically between the first and second mirrors. Braat teaches the third and fourth mirrors located physically between the first and second mirrors (Fig. 2). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the first optical group of Shafer have the third and fourth mirrors located in the position taught by Braat for the purpose of minimizing the size of the first optical group.

Regarding claims 14, 29 and 30, Shafer teaches wherein the numerical aperture is 0.75 or more (para. 0014).

Regarding claim 15, Shafer teaches the first optical group producing an intermediate virtual image (Fig. 4; para. 0015).

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Regarding claim 16, Shafer teaches wherein the at least four mirror of the first optical group include a convex mirror arranged most imageward in the beam path of the objective, and wherein the second optical group receives a beam from the convex mirror (Fig. 4).

Regarding claim 17, Shafer teaches wherein optical surfaces of each mirror of the objective are at least sections of surfaces of revolution each having a common axis of symmetry (Fig. 4; para. 0015).

Regarding claim 18, Shafer teaches wherein the second optical group is configured for independent compensative lateral aberrative correction. Page 9 of the current application states, "Fig. 1 shows aperture stop AS in Group G2 placed in a quasi-symmetrical manner, allowing the lateral chromatic aberration to be at least nearly self corrected within group G2 itself." Shafer teaches an aperture stop (Fig. 4) and therefore would be capable of the claimed performance as claimed.

Regarding claim 19, Shafer teaches an unobscured system aperture (Fig. 4).

Regarding claim 20, Shafer teaches wherein the unobscured aperture is located within the second optical group (Fig. 4).

Regarding claim 21, Shafer teaches being devoid of any planar folding mirrors (para 0016).

Regarding claim 22, Shafer teaches wherein an optical beam incident at the first optical group is divergent after a most imageward mirror of the first optical group (Fig. 4).

Regarding claim 23, Shafer teaches a parallel axes of symmetry of curvatures of each optical element of the first and second optical groups, and wherein no more than three of the optical elements are cut to deviate in a substantially non-rotation symmetric form (Fig. 4).

Regarding claim 24, Shafer teaches in sequence a first catadioptric sub group for producing a real intermediate image (Fig. 4), a second sub group including catoptric components for producing a virtual image (para 0015) and the second at least substantially dioptric group for producing a real image (para 0018).

Regarding claim 25, Shafer teaches in sequence a first field lens sub group (Fig. 4), a second catadioptric sub group comprising one or more negative lenses and a concave mirror (Fig. 4), generating axial chromatic aberration, a third sub group including an odd number of catoptric components (Fig. 4) and a fourth positive lens group (para 0018).

Regarding claim 26, Shafer teaches wherein the second optical group comprises a plurality of lenses, wherein a diameter of a beam incident upon each of the plurality of lenses is at least half a diameter of each lens (Fig. 4, para 0028).

Regarding claim 27, Shafer teaches wherein the objective is doubly telecentric (para 0023).

Regarding claim 28, Shafer teaches wherein optical paths of projected rays are redirected at each lens element of the second optical group at an angle of less than substantially 20 degrees (para 0048).

Response to Arguments

Applicant's arguments, see Amendment, filed October 12, 2004, with respect to the rejection(s) of claim(s) 1-30 under Shafer have been fully considered and are persuasive.

Therefore, the rejection has been withdrawn. However, upon further consideration of the newly

amended claims, a new ground(s) of rejection is made in view of Shafer in view of Takahashi and Shafer in view of Braat.

Shafer teaches all the claim limitations except for the location of the virtual intermediate image in the first optical group. Changing the curvature of the mirrors in the first optical group can easily change the location of the virtual intermediate image. The reference provided show that the intermediate image of a six-mirror projection system can be located in the claimed locations. The changes made to the claim limitations to distinguish over the Shafer prior art would have been obvious to one of ordinary skill in the art for the reasons provided above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joshua L Pritchett whose telephone number is 571-272-2318. The examiner can normally be reached on Monday - Friday 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew A Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JLP JP


DREW A. DUNN
SUPERVISORY PATENT EXAMINER